IDAHO DEPARTMENT OF HEALTH & WELFARE

LABORATORY CONNECTIONS

VOLUME I SPRING 2005

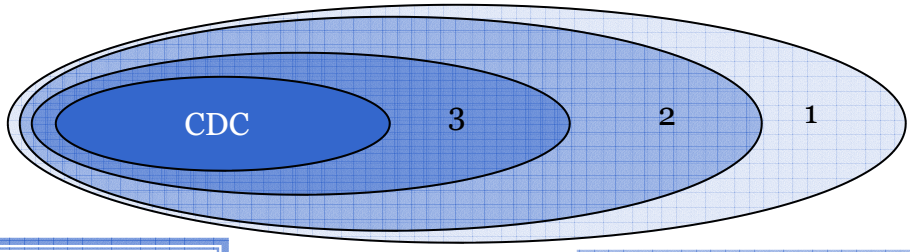
CHANGING PERSPECTIVES

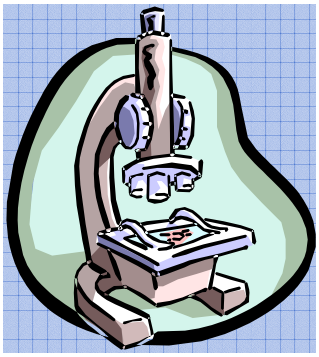
The Idaho Bureau of Laboratories and the Idaho Laboratory Response Network (LRN) which includes the Sentinel Laboratories are now preparing to become an integral part of the National LRN in the area of Chemical Terrorism and Preparedness. For those of you who have attended our more recent trainings, this should come as no surprise. In this issue of Laboratory Connections, you will receive important information regarding the responsibilities of a sentinel laboratory concerning sampling and shipping of human specimens that would need to be tested in the case of a chemical incident. Although terrorism is always a possibility, so are accidents and incidents that might involve the exposure of individuals to the myriad of agriculture and industrial chemicals found in Idaho. Please keep this information for future reference.

Chemical Terrorism Issue

- Laboratory Network for Chemical terrorism
- Agents / symptoms
- Specimen collection
- INSERT Shipping of rapid screen specimens

Laboratory Network for Chemical Terrorism





Level 3 Laboratories have personnel trained to detect exposure to an expanded number of chemicals in human blood and urine, including all Level 2 analyses, plus analyses of mustard agents, nerve agents and other toxic chemicals.

The IBL is a Level 2 Laboratory and has personnel trained to detect exposure to a limited number of toxic chemical agents in human blood or urine. Analysis of cyanide and toxic metals in human samples are examples of level 2 laboratory activities.

Sentinel Laboratories (Level 1) are responsible for: knowing how to properly collect and ship clinical specimens; ensuring specimens can be used in a criminal investigation; being familiar with chemical agents and their health effects; and being trained in shipping regulations.

If a chemical event were to occur, the CDC Rapid Response Team will determine if, and how, samples will be accepted by CDC. You may be asked to ship diagnostic samples to the IBL or to CDC. Specimens from up to 40 symptomatic patients can be analyzed by the CDC Rapid Toxic Screen. This process tests for 150 chemical agents or metabolites with results reported in less than 36 hours following sample receipt. Alternatively, the CDC Rapid Response Team may be available to assist with sampling and the transport of samples back to CDC. If the IBL has the technical means to test for chemicals identified by CDC, the IBL will test samples beyond the initial 40 symptomatic patients. If you have questions regarding chemical agents of terrorism please contact us, 208-334-2235.

Chemical Terrorism Agents and Syndromes ‡

Nerve Agents* Examples: Sarin, Tabun, Soman, VX. Onset of symptoms from exposure to vapor is seconds and for exposure to liquids minutes to hours.

Symptoms	Signs	Exposure Route / Treatment	Differential Diagnostic Considerations
Moderate exposure: Diffuse muscle cramping, runny nose, difficulty breathing, eye pain, dimming of vision, sweating, diarrhea **High Exposure**: The above plus sudden loss of consciousness, flaccid paralysis, seizures	Pinpoint pupils Muscle twitching and rippling under the skin Sweating Hyper-salivation Diarrhea Seizures Apnea	**Inhalation and dermal absorption** Atropine or 2-PAMCl Ventilation support	Pesticide poisoning from organophosphorous agents and carbamates

Blood Agents** Examples: Hydrogen cyanide, Cyanogen chloride. Onset of symptoms is seconds to minutes.

Symptoms	Signs	Exposure Route / Treatment	Differential Diagnostic Considerations
Moderate exposure: Dizziness, nausea, headache, eye irritation **High exposure:** Loss of consciousness	**Moderate exposure:** nonspecific findings **High exposure:** convulsions, cessation of respiration	**Inhalation and dermal absorption** Oxygen Amyl nitrite, sodium nitrite, sodium thiosulfate	Similar to exposure from carbon monoxide or hydrogen sulfide

Blister Agents * Examples: Mustards, Lewisite, Phosgene oxime. Onset of symptoms is 2 to 48 hours.

Symptoms	Signs	Exposure Route / Treatment	Differential Diagnostic Considerations
Burning, itching, or red skin Mucosal irritation (prominent tearing, and burning and redness of eyes) Shortness of breath Nausea and vomiting	Skin erythema Blistering Conjunctivitis and lid swelling Upper airways sloughing Pulmonary edema Marrow suppression with lymphocytopenia	**Inhalation, dermal absorption, and oral ingestion** Thermal burn type treatment Supportive care for Lewisite and Lewisite/Mustard mixtures: British Anti-Lewisite (BAL or Dimercaprol)	Diffuse skin exposure with irritants, such as caustics, sodium hydroxide, ammonia, etc.

**Pulmonary Agents ****Examples: Phosgene, Chlorine, Diphosgene. Onset of symptoms is 1-24 (rarely up to 72) hours.

Symptoms	Signs	Exposure Route/ Treatment	Differential Diagnostic Considerations
Shortness of breath Chest tightness Wheezing Mucosal and dermal irritation and redness	Pulmonary (non-cardiogenic) edema with some mucosal irritation (signs after symptoms)	**Inhalation** Supportive care Specific treatment depends on agents	Inhalation exposure to industrial gases (eg:, hydrochloric acid, ammonia) Mucosal irritation, airways reactions, and deep lung effects depend on the specific agent

Decontamination: * Rapid disrobing, water wash with soap and shampoo. ** Clothing removal. *** Clothing removal, Large amounts of water. **** None usually needed.

‡ This information is for reference only. Please consult medical experts for diagnosis and/or treatment.

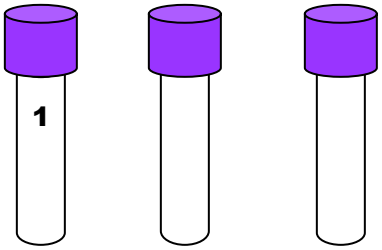
Reference: http://deploymentlink.osd.mil/pdfs/chemical_terrorism_pocket_guide.pdf

Chemical Terrorism Event Specimen Collection

Unless otherwise directed, collect the following specimens from each adult who may have been exposed. Blood tubes: 3 EDTA (purple top) and 1 gray or green top tube in that order. In addition to the blood tubes, collect at least 25 ml of urine in a screw cap urine cup for each patient. Only collect urine from pediatric patients, unless otherwise directed by CDC

3 EDTA (purple top) blood tubes

3, 5, or 7 ml tubes. If collecting in 3ml tubes collect a 4th purple top tube.



Tube #1 **Metals**

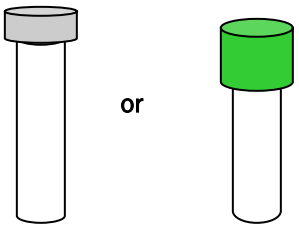
Tube #2 **Cyanide**

Tube #3 **Chemical adducts w/Hg b and albumin**

Place a "1" on tube #1 with indelible ink. Make sure the tube #1 is the first tube drawn, tube #2 is the second tube drawn and the correct label is put on each tube.

One gray or green top blood tube

3, 5, or 7 ml. gray or green top tubes. Must be collected after all the purple top tubes.

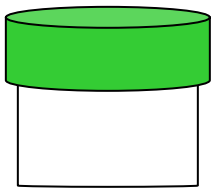


One gray or green top tube

Volatile Organic Compounds

At least 25 ml of urine

In a screw top urine cup.



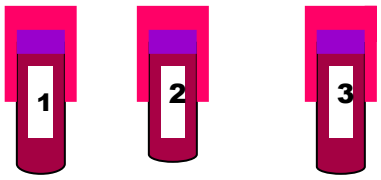
Military Nerve Agents

- Organophosphate Pesticides
- Incapacitating Agents and Drugs of Abuse
- Ricin and Saxitoxin
- Sulfur and nitrogen mustard
- Lewisite
- Heavy Metals (Hg, As, Sb, Ba, Be, Cd, Cs, Co, Pb, Mo, Pt, Tl, W, U)
- Creatinine correction

Mix the EDTA tubes and the green or grey top tubes by inverting 5-6 times.

Labeling Label specimens with labels generated by your facility. These labels may include the following information: medical records number, specimen identification number, collector's initials, and date and time of collection. Follow your facility's procedures for proper specimen labeling. The collector's initials and date and time of collection will allow law enforcement officials to trace the specimen back to the collector should the case go to court.

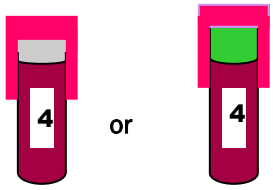
Place a single strip of evidence tape over the top of the tubes or urine cup, making sure it is secured on both sides. Initial the tape so that your initials are half on the cup or tubes and half on the tape. Please note: Labels should be placed on all tubes/cups so that when the tubes/cups are standing upright the bar code looks like a ladder.



Purple top tube #1 Metals

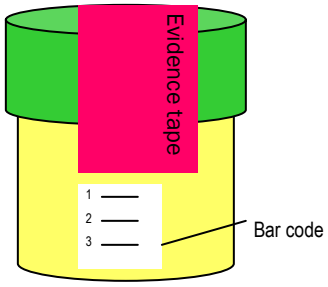
Purple top tube #2 Cyanide

Purple top tube #3 Chemical adducts w/Hgb & Albumin



Gray or green top tube

Volatile Organic Compounds



Military Nerve Agents,ect

Store blood samples at 4°C.

Freeze urine samples at -70°C or dry ice.

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"PROTECTING THE HEALTH AND ENVIRONMENT OF THE PEOPLE OF IDAHO THROUGH TESTING

Training corner

Idaho Bureau of Laboratories personnel are available to speak to your organization on issues such as chemical terrorism, the LRN, and clinical specimen collection and shipment. If you'd like to arrange a visit at your location or ours, give us a call!

Idaho Society for Clinical Laboratory Science (IDSCLS) convention will be held from 3 to 5 p.m. April 21st in Nampa. As part of that meeting there will be a presentation on basic chemical terrorism awareness and the LRN. Topics to be discussed include: chemicals as weapons, representative chemical agents, and the public health response to suspected chemical terrorism. Emphasis will be made on the roles of Sentinel Laboratories, IBL and CDC in the LRN.

NLT workshop "Working Together Towards TB Elimination" is set for March 23rd at the Doubletree Hotel Riverside Boise.

Costs associated with this publication are available from the Idaho Department of Health and Welfare. IDHW-600-14015-7/95. Cost per unit $2.60

CDC Shipping Instructions for Rapid Toxic Screen Specimens: **The Rest of the Story**

Blank For **each lot number of tubes and urine cups** used for collection, please provide two empty unopened purple-top tubes, two empty unopened green or gray-top tubes, and two empty unopened urine cups to serve as blanks for measuring background contamination.

Labeling: See Chart "Chemical Terrorism Event Specimen Collection"

Information provided on labels may prove helpful in correlating the results obtained from the Rapid Toxic Screen and subsequent analysis with the people from whom the specimens were collected.

Maintain a list of names with corresponding specimen identification numbers at the collection site to enable results to be reported to the patients.

The Three Components of Packaging:

- Primary receptacle (blood tubes or urine cups).
- Secondary packaging (materials for protecting primary containers, absorbent material and waterproof 95kPa pressure-resistant packaging).
- Outer container (Styrofoam-insulated corrugated, fiberboard containers)

Pack and ship these specimens as diagnostic specimens.

Secondary Packaging

Blood Tubes

- Separate each tube of blood collected from other tubes, or wrap each tube to prevent contact between tubes; this may be accomplished in a variety of ways such as a gridded box with absorbent material and sealed inside a plastic bag, sealable Styrofoam container, blood tube shipment sleeve and transport tube, or individually wrapped tubes sealed inside a plastic bag.

- Place absorbent material between the primary receptacle and the secondary packaging. Use enough absorbent material to absorb the entire contents of primary receptacles. **According to 49 CFR 173.199(b), the secondary packaging used must be capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95kPA (0.95 bar, 14 psi).**

- To facilitate processing, package blood tubes so that similar tubes are packaged together (i.e., all purple-tops together) and not mixed (i.e., purple-tops and green/gray–tops in the same package.

Urine Cups

- Separate each urine cup from other urine cups or wrap urine cups to prevent contact between urine cups.

- Place urine cups in secondary packages. A variety of secondary packages may be used, for example, gridded box wrapped with absorbent material and sealed inside a plastic bag or individually wrapped urine cups sealed inside a plastic bag. In either case, use a sealable plastic bag that complies with the requirement stated in 49 CFR 173.199(b).

Outer Containers: Styrofoam-insulated corrugated fiberboard containers
Do not ship frozen urine cups and blood tubes in the same package.

Blood tubes—Ship at 4°C

- For cushioning, place additional absorbent material in the bottom of the outer container.
- Add a layer of frozen cold packs.
- Place secondary containers on top of cold packs.
- Place additional cold packs or absorbent material between the secondary containers to reduce their movement within the outer container.
- Place a layer of frozen cold packs on top of the secondary containers.

Urine cups—Ship to ensure specimens remain frozen or freeze while in transport.

- For cushioning, place additional absorbent material in the bottom of the outer container.
- **Add a layer of dry ice. Note:** Do not use large chunks of dry ice for shipment, because large chunks have the potential for shattering urine cups during transport.
- Place additional absorbent material between wrapped urine cups to reduce their movement within the outer container.
- **Add an additional layer of dry ice**.

Paperwork

Preparing documentation
Place each shipping manifest (with specimen identification numbers in a plastic zippered bag on top of the specimens before closing the Styrofoam lid of the corrugated fiberboard container.

Chain of custody forms do not need to be transported with specimens. When specimens are transferred between entities/organizations, each entity/organization retains their chain of custody forms. Carrier tracking numbers must be used in shipments.

Additional References →

CDC Emergency Preparedness & Response
http://www.bt.cdc.gov
Agency for Toxic Substances and Disease Registry
http://www.atsdr.cdc.gov
The Medical NBC Online Information Server
http://www.nbc-med.org
USAMRICD Chemical Casualty Care Division (CCCD)
https://ccc.apgea.army.mil
Office of Hazardous Materials Safety
http://hazmat.dot.gov
Center for Nonproliferation Studies
http://cns.miis.edu
The Center for Defense Information
http://www.cdi.org